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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/918,463	08/01/2001	Yongju Jung	1567.1014	2888

49455 7590 08/03/2007
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EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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08/03/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/918,463	JUNG ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,8-16,19,20,33 and 36-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 38-41 is/are allowed.
- 6) ☒ Claim(s) 1,8-16,19,20,33,36 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communication filed on 5/18/07. Applicant's arguments have been considered, but are not persuasive. Claims 1, 8-16, 19, 20, 33 and 36-41 are pending. This Action is FINAL, as necessitated by amendment.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 19 and 20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 19 recites "a volume ratio of the weak polar solvent to the strong polar solvent to the lithium protection solvent is 3:1:1", which is not supported by the specification as filed. The volume ratios disclosed in Table 1 provide support only for the specific solvent combinations described in Examples 1-7. The specific volume ratios disclosed by Table 1 cannot be broadened to describe general solvent groups. For example, Example 1 teaches a volume ratio of dimethoxyethane to sulfolane to 1,3-dioxolane of 3:1:1. Thus the specification only supports a volume ratio of 3:1:1 when dimethoxyethane/ sulfolane/1,3-dioxolane are the only solvents. The claim recites open language such as "the electrolyte comprising", which encompasses embodiments not disclosed by the Examples in Table 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 8-16, 19, 20, 33, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vourlis, US 5,432,030 in view of Evans et al., US 4,302,520.

Vourlis teaches a lithium/FeS₂ rechargeable electrochemical cell comprising an electrolyte including a solvent mixture of 3-methyl-2-oxazolidone (strong polar), 1,3-dioxolane (lithium protect) and 1,2-dimethoxyethane (weak polar) with a LiCF₃SO₃ salt. See abstract. FeS₂ is a sulfur based compound comprising an iron additive. The anode may contain lithium or a lithium alloy (3:42-45). The cathode may contain a conductive material and a binder (Ex. 1). The cathode material is coated on a current collector (Ex. 4). The cathode may contain In₂S₃, Pb₃O₄ or TiS₂ (1:47-50). Sample D in Table 1 teaches a volume ratio of 3:1:1 of dimethoxyethane to 3M2O to 1,3-dioxolane (weak polar to strong polar to lithium protection). Example 2 in Table 2 teaches an electrolyte with 23.3% 1,3-dioxolane/46.7% dimethoxyethane/30% 3M2O. See claim 1.

Vourlis does not explicitly teach the strong polar solvent sulfolane in the claimed volume ratio of the mixed organic solvent.

However, Evans teaches an electrochemical cell comprising a solid cathode material, a lithium anode and an organic electrolyte. The solid cathode material includes metallic bismuth, metallic sulfur and metallic iron or lead. The electrolyte includes a mixed solvent and a solute

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(abstract). The cathode may include a conductive agent (2:20-21). The anode may comprise lithium or a lithium alloy (2:46-55). Preferred solvents for the electrolyte include sulfolane (strong polar), acetonitrile (strong polar), tetrahydrofuran (lithium protect), methyl tetrahydrofuran (weak polar), dioxolane (lithium protect), 3-methyl-2-oxazolidone (strong polar), propylene carbonate (strong polar), butyrolatone (strong polar), ethylene glycol sulfite (strong polar), dimethylsulfite (strong polar), dimethyl sulfoxide (strong polar) and dimethoxyethane (weak polar) (4:28-39). Of the preferred solvents, the best include sulfolane, 3M2O, dimethoxyethane and 1,3-dioxolane because they appear more chemically inert to battery components and have wide liquid ranges, and especially because they permit highly efficient utilization of the cathode materials (4:34-40).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have known that both sulfolane and 3M2O would have functioned as strong polar solvents and could have been substituted for one another. Evans teaches both solvents are preferred because they permit highly efficient utilization of the cathode materials (4:34-40). Therefore, one of skill would have been motivated to substitute sulfolane for the 3M2O disclosed by Vourlis to improve utilization of the cathode material and because both solvents inherently function as strong polar solvents.

Furthermore, the courts have ruled that by the presentation of a Markush group for the strong polar solvents, Applicant has made the representation that for the purpose of the present invention, the elements of the group are equivalents. Having made this representation, Applicant may not now argue that these two elements are not equivalents. In re Skoll, 187 USPQ 481 (CCPA 1975). Thus, the invention would have been obvious because 3M2O is considered

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equivalent to the strong polar solvent sulfolane because both are strong polar solvents.

Applicant's disclosure teaches that 3-methyl-2-oxazolidone may be used as the strong polar solvent. Furthermore, the courts have ruled where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA 1250, 156 F.2d 239, 70 USPQ 412. The courts have held that a limitation merely with respect to proportions in a composition of matter or process will not support patentability unless such limitation is "critical". Minerals Separation, Ltd. v. Hyde, 242 U.S. 261 (1916).

Allowable Subject Matter

Claims 38-41 are allowed. The prior art does not teach or suggest the claimed solvent mixtures consisting of the claimed four solvents in the claimed volume ratios.

Response to Arguments

Applicant's arguments filed 5/18/07 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 1, 2007


TRACY DOVE
PRIMARY EXAMINER